Subchapter 6 SANITARY SEWERS

5:21-6.1 Sanitary Sewer System

(a) Sanitary sewer systems, where installed, shall conform to the standards contained in this subchapter.

(b) When plans for future development necessitate oversizing or grade changes, the municipality or utility authority may enter into an agreement with the developer to address the fair share of the costs of improvements not required for the proposed development.

(c) If a public sanitary sewer system will be provided to the area within a six-year period as indicated in the municipal sewer master plan, official map, or other official document, a municipality may require installation of a capped system within the road right-of-way or existing utility authority easements to service the approved lots; or alternatively, a municipality may require a performance guarantee in lieu of the improvement. Capped sanitary sewers shall be allowed only in areas indicated for sewer service in the State of New Jersey Statewide Water Quality Management (WQM) Plans and where permitted by NJ DEP through sewer connection approval.

(d) Individual subsurface disposal systems shall comply with N.J.A.C. 7:9A-3.2 and 3.16.

(e) The applicant shall submit to the municipality or utility authority for review for compliance with this subchapter details of the planned pipes, joints, mains, laterals, and appurtenances. All materials used for sanitary sewer systems shall be manufactured in the United States, wherever available, as governed by P.L. 1982, c. 107, effective date October 3, 1982. The details shall comply with all standards and specifications listed in this subchapter.

5:21-6.2 System Planning, Design, and Placement

(a) The planning, design, construction, installation, modification, and operation of any treatment works or sanitary system shall be in accordance with the flow and design criteria set forth in N.J.A.C. 7:14A-23 and with the applicable NJ DEP rules implementing the New Jersey Water Pollution Control Act (N.J.S.A. 58:10A-1 et seq.) and the New Jersey Water Quality Planning Act (N.J.S.A. 58:11A-1 et seq.); and for items not covered by NJ DEP rules, with *ASCE Manual on Engineering Practice No. 60*, incorporated herein by reference; and in the Pinelands Area, with the Pinelands Comprehensive Management Plan; and in the coastal area, with NJ DEP rules implementing the Coastal Area Facilities Review Act (N.J.S.A. 13:19-1 et seq.). Where the NJ DEP accepts reduced flows, those reduced flows shall also be accepted under these rules.

(b) Sanitary sewer pumping stations shall be considered where gravity system design leads to excessive sewer depths which are not economically justifiable and shall comply with N.J.A.C. 7:14A-23.10, 23.11, and 23.12.

(c) System design and placement shall comply with the following specifications:

1. Except where otherwise specified by the municipality or utility authority, sanitary sewer manholes, when located within the municipal right-of-way, shall be at or near the centerline of the paved cartway, but at a five- (5) foot minimum from the edge of the pavement. Sanitary sewer mains shall be a minimum of ten (10) feet from the right-of-way line.

2. Easements shall be in a form approved by the utility authority or the municipal engineer and municipal attorney. Easements shall be required for all sanitary sewer lines which are not within a public right-of-way. Easements shall be a minimum of 20 feet wide for sanitary sewers that are not more than 15 feet deep. For sewers that are more than 15 feet deep, easements shall be a minimum of 30 feet wide. The depth of the sewer shall be measured from the design invert of the pipe to the surface of the proposed final grading. Where the easement is located adjacent to a right-of-way, the municipality or authority may approve a narrower easement.

3. Common sewer laterals shall be permitted in accordance with the Plumbing Subcode of the Uniform Construction Code (N.J.A.C. 5:23-3.15).

4. All sewers shall be designed to meet the New Jersey Department of Environmental Protection's slope standards at N.J.A.C. 7:14A-23.6(b).

5. Except where shallower depths are permitted by the municipality or utility authority, sewer lines, including force mains and laterals, shall be constructed at least three feet below the proposed grade (as measured from the top of the pipe to the grade elevation).

6. Pipe materials used in the construction of gravity sanitary sewers shall be reinforced concrete, ductile iron, PVC, or clay pipe. All pipe and appurtenances shall comply with AWWA and ASTM standards referenced in this paragraph, which are incorporated herein by reference. Where PVC pipe is installed, a metallic locator tape shall also be installed adjacent to the pipe.

   i. Reinforced concrete pipe shall be used only in sizes 24" and larger, and shall meet all the requirements of ASTM C76. All pipe shall be Class III strength installed with Class C ordinary bedding, except in the following conditions where stronger pipe may be required:

      (1) For depths less than three (3) feet, measured from the top of the pipe, installed under traffic areas, Marston Class IV pipe shall be required.

      (2) The presence of clay soils, poor bedding conditions, or other unusual loading conditions shall be given special consideration and the developer shall submit an engineering analysis to the municipality or authority for approval.

   ii. PVC sewer pipe shall have bell and spigot ends, and O-ring rubber gasketed joints. PVC pipe and fittings shall conform to ASTM D3034, with a minimum wall thickness designation of SDR 35, or shall conform to ASTM F679, F789, F794, or F949 with a designated pipe stiffness of PS-46.

      (1) The plastic material from which the pipe and fittings are extruded shall be impact types of PVC, unplasticized, having high mechanical strength and maximum chemical resistance, conforming to Type 1, Grade 1 of the specification for rigid polyvinyl chloride compounds, ASTM D1784.

      (2) Pipe shall be free from defects, such as bubbles or other imperfections, in accordance with accepted commercial practice.

Test results demonstrating that the pipe meets ASTM D2444 for impact, and ASTM D2321 for deflection and pipe stiffness, shall be provided when requested by the municipality or utility authority.

(3) Joints shall conform to ASTM D3212. Rubber-ring gaskets shall conform to ASTM F477. The gasket shall be the sole element depended upon to make the joint watertight.

(4) The pipe shall be installed as specified in ASTM D2321 and as specified in Figure 6.1. When installing pipe in unstable soil or excessive ground water, a determination regarding special precautions, such as poured concrete slabs, shall be made by the municipal engineer or utility authority engineer.

(5) Bedding, haunching, and initial backfill material shall be placed in six-inch lifts and be Class IA, IB, or II embedment material conforming with ASTM D2321, unless otherwise approved by the municipal or utility authority engineer. Soil aggregate I-8 conforming to Article 901.09, Table 901-2 of the 1989 New Jersey Department of Transportation's *Standard Specifications for Road and Bridge Construction* when compacted to 95 percent maximum dry density, and stone crushing conforming with AASHTO designation M43-88 (ASTM designation D448) size no. 8, 1/8 inch to 3/8 inch (2.36 mm to 9.25 mm) meet this requirement. All material shall be clean and free flowing, and shall meet all ASTM C33 specifications for quality and soundness.

iii. Ductile iron pipe shall be centrifugally cast in metal or sand-lined molds to ANSI/AWWA C151/A21.51. Joints shall be rubber gasketed joints that conform to ANSI/AWWA C111/A21.11 or flanged joints that comply with ANSI/AWWA C115/A21.15. Pipe shall be a minimum of Class 50. The outside of the pipe shall be coated with a uniform thickness of hot applied asphaltic coating. In corrosive soils, pipe shall be encased in polyethylene in accordance with ANSI/AWWA C105/A21.5. Ductile iron pipe shall be installed with Class C, Ordinary Bedding when site conditions allow. The inside shall be lined with cement in accordance with ANSI/AWWA C104/A21.4, or where hydrogen sulfide is present, ductile iron pipe with polyethylene coating that protects the interior of the pipe shall be used.

iv. Clay pipe shall comply with ASTM C700.

7. Inverted siphons and outfalls shall be constructed of ductile iron pipe or PVC pipe, as specified above. Inverted siphons shall consist of a minimum of two pipes with provisions for flushing. Flow control gates shall be provided in the chambers.

8. Force mains shall be designed in accordance with the requirements of N.J.A.C. 7:14A-23. Force mains shall be constructed of ductile iron pipe, as specified above, or PVC pipe that meets ASTM D1785, ASTM D2241, or AWWA C909. Where PVC is installed, a metallic locator tape shall also be installed in the trench adjacent to the pipe.

9. In addition to the pipe materials at N.J.A.C. 7:14A-23.6(b)5, PVC pipe shall be considered a suitable material.

10. For other than PVC pipe, pipe and manhole bedding shall be provided as specified in *Gravity Sanitary Sewer Design and Construction, ASCE Manual on Engineering Practice No. 60*, prepared by the Joint Task Force of the American Society of Civil Engineers and Water Pollution Control Federation, New York, 1982. Any pipe material not covered by this manual shall be installed in accordance with the manufacturer's recommendations.

    i. The municipality or the authority may require the developer to provide an opinion of a professional engineer regarding the suitability of the on-site material to be used as backfill. The municipality or authority shall rely on this opinion.

    ii. Where the on-site material is deemed suitable, the opinion shall specify the appropriate installation methods for the material. Where the on-site material is deemed not suitable, the opinion shall specify modification or replacement of the material and the appropriate installation methods for the specified material.

11. Manholes shall comply with the standards in *ASCE Manual on Engineering Practice No. 60* and shall meet the following requirements:

    i. Manholes shall be precast concrete or concrete block. Manhole barrels shall be a minimum of four feet in diameter when serving sewers 24 inches or less in diameter and shall be a minimum of five feet in diameter when serving sewers greater than 24 inches in diameter. Where manholes are precast, the base and first section shall be monolithically cast. Concrete block shall be coated with two (2) coats of portland cement mortar. Precast concrete or concrete block shall be sealed with two coats of an acceptable waterproofing tar, asphalt, or polyplastic alloy, with enough time allowed between the seal coats to bond.

    ii. Masonry brick, concrete block, or half rings may be used to make vertical adjustments to rims.

    iii. Where pipe size varies, crowns of pipes shall be matched, except in special conditions, as required by applicable NJ DEP rules.

    iv. If precast manhole barrels and cones are used, they shall conform to ASTM C478, with round rubber-gasketed joints conforming to ASTM C443. Maximum absorption shall be nine (9) percent, in accordance with ASTM C478, Method A. Cracked manholes shall not be used. The top riser section of precast manholes shall terminate less than 18 inches below the finished grade to provide for proper adjustment.

    v. Manhole frames and covers shall be of cast iron conforming to ASTM A48, Class 30, or ductile iron conforming to ASTM 536, and shall be suitable for H-20 loading capacity. All manhole covers in unpaved rights-of-way or in remote areas shall be provided with a locking device, as specified by the municipality or utility authority. The words "SANITARY SEWER" shall be cast integrally into the manhole cover.

vi. Manholes shall be supplied with flexible, watertight adaptors, such as inserts or gaskets, conforming to ASTM C923 and suitable for the pipe materials used.

vii. Masonry units shall conform to the following requirements:

(4) Clay or shale brick shall conform to AASHTO M114, Grade MW, with the following modifications:

(A) The length of the brick shall be not less than 7.75 inches and shall be not more than 8.25 inches. The width of the brick shall be not less than 3.50 inches and not more than 3.88 inches. The depth of the brick shall be not less than 2.10 inches and not more than 2.38 inches.

(B) The maximum water absorption, by five-hour boiling, shall be 14 percent based on the average of five bricks and shall be 16 percent for individual bricks.

(5) Concrete block shall be solid, precast segmental concrete masonry units. Portland cement shall conform to ASTM C150. Concrete block shall conform to the following dimensional requirements:

(A) The blocks shall be either rectangular in shape, or shall be curved blocks with the inside and outside surfaces curved to the required radii, whichever is appropriate to the shape of the structure. The length shall be not less than 12 inches and not more than 18 inches. The height shall be not less than five inches and not more than eight inches. The width shall be not less than eight inches. Blocks of special shapes and heights may be used to allow for the reduction of cross-sectional areas at the cones or tops of manholes, or may be used in the top courses of all structures so that the head castings shall be set at the required elevation on a mortar bed not more than one-half inch thick without cutting the blocks. All blocks shall have an interlocking-type joint at the ends, so as to form a strong, rigid structure. All blocks shall be sound and free from all cracks or other defects.

(6) Concrete brick shall conform to the requirements of 5:21-6.2(c)11.vii(2)(A), except that the dimensions shall conform to the requirements for clay or shale brick in 5:21-6.2(c)11.vii(1)(A).

12. Laterals and cleanouts shall comply with the following:

i. The house connection or lateral from the street main to the cleanout shall be considered an integral part of the sanitary sewer system. The type of material used for the house connection shall be as follows: four-inch cast-iron soil pipe, extra heavy; four-inch PVC pipe, Schedule 40 or SDR 35; four-inch ABS plastic pipe, SDR 35; or four-inch ductile iron pipe. Common laterals for multifamily units shall be designed to have adequate conveyance capacity.

ii. Wye connections shall be the same material as the sewer main. Saddles shall be used only for connection to an existing main.

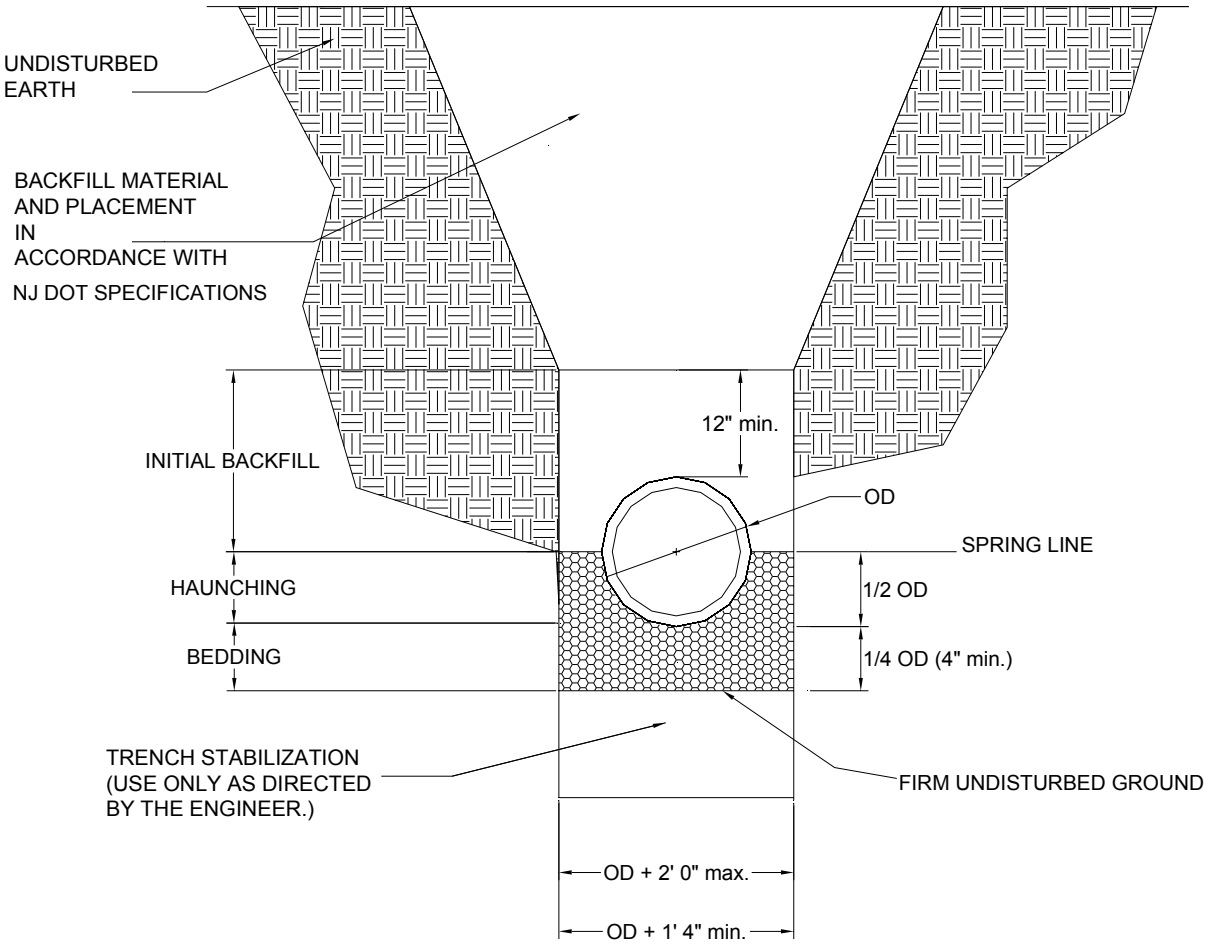
iii. Bends in house connection lines shall be made using standard fittings. A riser with a cleanout shall be provided in the lateral between the edge of the pavement and property line, or within a designated easement as determined by the municipality.

iv. Inspection cleanouts or observation tees within the easement or right-of-way shall be fitted with either a metallic cap or a nonmetal cap fitted with a metallic plug that is suitable for locating the cleanout. Caps shall have a depressed or inverted nut. The inspection cleanout or observation tee shall be placed between the curb or edge of pavement and property line, or within a designated easement.

v. Connections beyond the cleanout are under the jurisdiction of the Plumbing Subcode of the Uniform Construction Code (N.J.A.C. 5:23-3.15) through the plumbing subcode official. The pipe size and specifications shall comply with the regulations and requirements of the Plumbing Subcode of the Uniform Construction Code.

vi. As-built drawings that include the location of plumbing wyes, as supplied by the contractor, shall be submitted to the municipal engineer.

Figure 6.1



NOTES:
1. OD = OUTSIDE DIAMETER

2. INSTALL CLASS 52 D.I.P. WHEN THE DEPTH OF THE INSTALLATION IS LESS THAN 3' 0" OR EXCEEDS 20' 0".

SDR - 35 PVC SANITARY SEWER TRENCH DETAIL